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CLAIMS

[The scope of a claim for utility model registration]
[Claim 1]A record reproduction level control device comprising:
An input level control circuit which adjusts a level of an input signal.
A record circuit which records a signal adjusted by said input level control circuit and level information about an input level adjusted with said input level control circuit to the same recording medium.
A regenerative circuit which reads a signal and level information which were recorded on said recording medium, and is amplified to a predetermined level.
An output level equalization circuit which carries out level adjustment by level information to which a signal brought about by said regenerative circuit is brought by said regenerative circuit.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed explanation of the device]
[0001]
[Industrial Application]
This design is used for R-DAT (rotary head type digital audio taperecorder) etc., for example, and is related with a suitable record reproduction level control device.
[0002]
[Description of the Prior Art]
Generally in recording and reproducing devices, such as an audio signal containing R-DAT or an analog audio tape recorder, the input level control circuit is provided. And the input level of the sauce beforehand recorded at the time of record of an audio signal etc. (at the time of sound recording) is investigated, and, if possible, he raises a recording level in the limit where an input signal is not distorted by said input level control circuit, and is trying to record.
[0003]
However, when doubling an input level by said input level control circuit at the time of sound recording, it is not easy to look for a portion with the highest input level. It is also just going to experience frequently to readjust a recording level again after a while after a recording start actually, to rewind the magnetic tape which is a recording medium, and to do sound recording again again.
[0004]
[Problem(s) to be Solved by the Device]
By the way, when the sauce which it is going to record is obtained again, it is also possible to do again operation which was described above, but when like [the sauce which it is going to record, for example / a broadcast musical program etc.], rerecording flatly again is already impossible. Therefore, Oba of the maximum recording level is carried out, it records in the state with much distortion, or a recording level is extracted too little, and the state where it cannot but record in the state where S/N fell occurs.
[0005]
In order to avoid a situation which was described above, when the recording start back is adjusted, and a recording level is again readjusted during sound recording, the problem that a regeneration level changes from the portion which readjusted the recording level at the time of playback arises.
[0006]
This design is accomplished in view of a point which was described above, and it is making into the technical problem to provide the record reproduction level control device from which the regeneration level at the time of reproduction does not change also in the case where a recording level is readjusted after a recording start.
[0007]
[Means for Solving the Problem]
A record reproduction level control device of this design accomplished in order to attain said technical problem, For example, the input amplifiers 2 which adjust a level of an input voice signal and an audio signal adjusted with the input amplifiers 2, The record circuit 8 which records level information about an input level adjusted with the input amplifiers 2 to the same magnetic tape 10, It has the feature at a point of having provided the regenerative circuit 11 which reads an audio signal and level information which were recorded on the magnetic tape 10, and is amplified to a predetermined level, and the output amplifier 13 which carries out level adjustment by level information to which an audio signal brought about by the regenerative circuit 11 is brought by the regenerative circuit 11.

[0008]
[Function]
In the record reproduction level control device of said composition, the audio signal adjusted with the input amplifiers 2 and the level information about the input level adjusted with the input amplifiers 2 are recorded by the record circuit 8 to the same magnetic tape 10. At the time of reproduction, it accomplishes so that level adjustment may be carried out by the level information to which the audio signal brought about by the regenerative circuit 11 is similarly brought by the regenerative circuit 11.
[0009]
For this reason, also in the case where a recording level is readjusted even if after a recording start, the regeneration level at the time of reproduction is adjusted with said level information, and a regeneration level becomes possible [obtaining the reproducing output which does not change on the way].
[0010]
[Example]
Hereafter, this design is explained based on the example shown in a figure. Drawing 1 shows an example of the record reproduction level control device of this design which made R-DAT the example with a block diagram.
[0011]
In drawing 1, 1 shows the input terminal of the audio signal and the input signal supplied to this input terminal 1 is supplied to the input amplifiers 2. These input amplifiers 2 constitute the input level control circuit which adjusts a level for an input signal in response to the level control signal from a control section mentioned later. The input signal by which level adjustment was carried out is supplied to A/D converter 3, and is changed into a digital signal by these input amplifiers 2.

[0012]
The input signal changed into the digital signal by said A/D converter 3 is supplied to the digital disposal circuit 4. The sub-code processing circuit 5 is connected to this digital disposal circuit 4.
The control section 6 which comprises a microcomputer further is connected to this sub-code processing circuit 5.
The key input section 7 which directs various kinds of operational modes is connected to said control section 6, and to this key input section 7. The level at the time of record of an audio signal. The input level adjusting volumes 71 to adjust, the output level adjusting volumes 72 which adjust the output level of the reproduced sound signal at the time of reproduction, REW ** 73 which chooses the rewinding mode of apparatus, PLAY ** 74 which chooses reproduction mode, and fast forward mode. FF ** 75 to choose, STOP ** 76 which chooses a stop, and REC ** which directs sound recording mode 77 grade are arranged.
[0013]
And from said control section 6, a level control signal is supplied to said input amplifiers 2, and the level of the input signal supplied to the input terminal 1 is adjusted according to the value adjusted by the input level adjusting volumes 71 in said key input section 7. The level information about the input level obtained by the input level adjusting volumes 71 in said key input section 7 is supplied to said sub-code processing circuit 5 via the control section 6. The sub-code processing circuit 5 codes the level information adjusted by the input level adjusting volumes 71 of the key input section 7, and transmits it to said digital disposal circuit 4.
[0014]
The input signal to which digital conversion of the digital disposal circuit 4 was carried out by said A/D converter 3
Information and the level information from said sub-code processing circuit 5 are multiplexed, and it sends out to the record circuit 8. In response to said multiplexed signal, power amplification of the record circuit 8 is carried out, this is supplied to the rotary head 9, and the rotary head 9 records said multiplexed signal to the magnetic tape 10 which is the recording medium which ****ed to this rotary head 9.
[0015]
On the other hand, the multiplexed signal recorded on said magnetic tape 10 is read by the rotary head 9, and is amplified by the regenerative circuit 11 at a predetermined level. And the digital disposal circuit 4 is supplied and it separates into signaling information and level information. The former signaling information is supplied to D/A converter 12, is changed into an analog voice signal and supplied to the output amplifier 13 which constitutes an output level equalization circuit. The sub-code processing circuit 5 is supplied, it gets over to the information corresponding to the level at the time of record, and the level information in the latter sub-

code signal is brought to the control section 6.
[0016]
Said control section 6 supplies the level control signal which added the information corresponding to the level at the time of the record from said sub-code processing circuit 5 to the level control information from the output level adjusting volumes 72 in said key input section 7 to the output amplifier 13. For this reason, by said level control signal, the level control of the analog voice signal changed by D/A converter 13 is carried out, and it is brought to the output terminal 14.
[0017]
Drawing 2 shows the data format within the sub-code block in R-DAT. That is, the sub-code by which R-DAT is mainly used for the sub-data area of magnetic tape as position information is recorded. 8 blocks of this sub-code is recorded at a time on the both outsides of audio PCM, and each block consists of 288 bits and comprises 8 bits SYNC, a 16 bits header unit, 8 bits parity, and 256-bit subcode data. As shown in drawing 2, a pack comprises 64 bitwises, and said subcode data have the 4 bits item part 20, the 52 bits data division 21, and the 8-bit parity 22.
[0018]
In this design, the 52-bit packed-data part 21 shown in drawing 2 is used, and the level information about the input level adjusted with said input level control circuit 2, i.e., input amplifiers, is recorded as a digital signal at the time of record. In this case, when the input level adjusting volumes 71 in the key input section 7 are manually operated after a recording start on the basis of the level-setting value at the time of a recording start, a difference value is recorded by making that volume variation into "+" or the "−" value.
[0019]
In the time of reproduction, the difference value data corresponding to the volume variation after said recording start is reproduced by the sub-code processing circuit 5, and this is supplied to the control section 6. Said control section 6 supplies the level control signal which added the difference value information from said sub-code processing circuit 5 to the level control information from the output level adjusting volumes 72 in said key input section 7 to the output amplifier 13.
[0020]
For example, if the input level adjusting volumes 71 were operated after the recording start at −10 dB and a recording level of −5 dB was changed, for example, at this time, a recording level of +5 dB will be carried out, and will be recorded to the magnetic tape 10. And supposing an output level is adjusted by the output level adjusting volumes 72 at the time of reproduction, for example, it reproduces at −10 dB, When the playback position of a tape arrives at the portion (portion to which it was made to increase only 5 dB) which changed the recording level to −5dB, a control signal is supplied to the output amplifier 13 from the control section 6 in order to reduce a regeneration level only by 5 dB. Therefore, the reproduction output level brought to the output terminal 14 despite a join office becomes fixed with as [of −10dB].
[0021]
Although the above explained this design based on the case where it applies to R-DAT, this design is also employable as for example, an analog audio tape recorder. By namely, the thing which the information according to the amount of manual operation of the input level adjusting volumes after a recording start is made to superimpose on a record signal as a low frequency signal below an audible zone, and you record, and is made to change an output level based on this low frequency signal at the time of reproduction. The same operation effect can be obtained with having been shown in said example.
[0022]
[Effect of the Device]
As mentioned above, according to the record reproduction level control device of this design, the input signal adjusted with the input level control circuit, i.e., input amplifiers, and the level information about the input level adjusted with input amplifiers are recorded by the record circuit to the same recording medium, i.e., magnetic tape. In the time of playback, in an output level equalization circuit, i.e., output amplifier, it accomplishes so that level adjustment of the regenerative-signal information read from magnetic tape may be carried out by the level information similarly read from magnetic tape.
[0023]
For this reason, also in the case where a recording level is readjusted even if after a recording start, the regeneration level at the time of reproduction is adjusted with said level information, and it becomes possible to obtain the reproducing output from which a regeneration level does not change on the way.

Therefore, level adjustment at the time of sound recording can be performed comparatively easily, and when it becomes clear after a recording start that a recording level is unsuitable nature, the good record reproduction of S/N can be attained low-skew by operating input level adjusting volumes.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application]
This design is used for R-DAT (rotary head type digital audio taperecorder) etc., for example, and is related
with a suitable record reproduction level control device.
[0002]

[Translation done.]

* NOTICES *

PRIOR ART

[Description of the Prior Art]
Generally in recording and reproducing devices, such as an audio signal containing R-DAT or an analog audio tape recorder, the input level control circuit is provided. And the input level of the sauce beforehand recorded at the time of record of an audio signal etc. (at the time of sound recording) is investigated, and, if possible, he raises a recording level in the limit where an input signal is not distorted by said input level control circuit, and is trying to record.
[0003]
However, when doubling an input level by said input level control circuit at the time of sound recording, it is not easy to look for a portion with the highest input level. It is also just going to experience frequently to readjust a recording level again after a while after a recording start actually, to rewind the magnetic tape which is a recording medium, and to do sound recording again again.
[0004]

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Device]
As mentioned above, according to the record reproduction level control device of this design, the input signal adjusted with the input level control circuit, i.e., input amplifiers, and the level information about the input level adjusted with input amplifiers are recorded by the record circuit to the same recording medium, i.e., magnetic tape. In the time of playback, in an output level equalization circuit, i.e., output amplifier, it accomplishes so that level adjustment of the regenerative-signal information read from magnetic tape may be carried out by the level information similarly read from magnetic tape.
[0023]
For this reason, also in the case where a recording level is readjusted even if after a recording start, the regeneration level at the time of reproduction is adjusted with said level information, and it becomes possible to obtain the reproducing output from which a regeneration level does not change on the way.
Therefore, level adjustment at the time of sound recording can be performed comparatively easily, and when it becomes clear after a recording start that a recording level is unsuitable nature, the good record reproduction of S/N can be attained low-skew by operating input level adjusting volumes.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Device]
By the way, when the sauce which it is going to record is obtained again, it is also possible to do again operation which was described above, but when like [the sauce which it is going to record, for example / a broadcast musical program etc.], rerecording flatly again is already impossible. Therefore, Oba of the maximum recording level is carried out, it records in the state with much distortion, or a recording level is extracted too little, and the state where it cannot but record in the state where S/N fell occurs.
[0005]
In order to avoid a situation which was described above, when the recording start back is adjusted, and a recording level is again readjusted during sound recording, the problem that a regeneration level changes from the portion which readjusted the recording level at the time of playback arises.
[0006]
This design is accomplished in view of a point which was described above, and it is making into the technical problem to provide the record reproduction level control device from which the regeneration level at the time of reproduction does not change also in the case where a recording level is readjusted after a recording start.
[0007]

[Translation done.]

* NOTICES *

MEANS

[Means for Solving the Problem]
A record reproduction level control device of this design accomplished in order to attain said technical problem, For example, the input amplifiers 2 which adjust a level of an input voice signal and an audio signal adjusted with the input amplifiers 2, The record circuit 8 which records level information about an input level adjusted with the input amplifiers 2 to the same magnetic tape 10, It has the feature at a point of having provided the regenerative circuit 11 which reads an audio signal and level information which were recorded on the magnetic tape 10, and is amplified to a predetermined level, and the output amplifier 13 which carries out level adjustment by level information to which an audio signal brought about by the regenerative circuit 11 is brought by the regenerative circuit 11.
[0008]

[Translation done.]

* NOTICES *

OPERATION

[Function]
In the record reproduction level control device of said composition, the audio signal adjusted with the input amplifiers 2 and the level information about the input level adjusted with the input amplifiers 2 are recorded by the record circuit 8 to the same magnetic tape 10. At the time of reproduction, it accomplishes so that level adjustment may be carried out by the level information to which the audio signal brought about by the regenerative circuit 11 is similarly brought by the regenerative circuit 11.
[0009]
For this reason, also in the case where a recording level is readjusted even if after a recording start, the regeneration level at the time of reproduction is adjusted with said level information, and a regeneration level becomes possible [obtaining the reproducing output which does not change on the way].
[0010]

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EXAMPLE

[Example]
Hereafter, this design is explained based on the example shown in a figure. Drawing 1 shows an example of the record reproduction level control device of this design which made R-DAT the example with a block diagram.
[0011]
In drawing 1, 1 shows the input terminal of the audio signal and the input signal supplied to this input terminal 1 is supplied to the input amplifiers 2. These input amplifiers 2 constitute the input level control circuit which adjusts a level for an input signal in response to the level control signal from a control section mentioned later. The input signal by which level adjustment was carried out is supplied to A/D converter 3, and is changed into a digital signal by these input amplifiers 2.

[0012]
The input signal changed into the digital signal by said A/D converter 3 is supplied to the digital disposal circuit 4. The sub-code processing circuit 5 is connected to this digital disposal circuit 4.
The control section 6 which comprises a microcomputer further is connected to this sub-code processing circuit 5.
The key input section 7 which directs various kinds of operational modes is connected to said control section 6, and to this key input section 7. The level at the time of record of an audio signal. The input level adjusting volumes 71 to adjust, the output level adjusting volumes 72 which adjust the output level of the reproduced sound signal at the time of reproduction, REW ** 73 which chooses the rewinding mode of apparatus, PLAY ** 74 which chooses reproduction mode, and fast forward mode. FF ** 75 to choose, STOP ** 76 which chooses a stop, and REC ** which directs sound recording mode 77 grade are arranged.
[0013]
And from said control section 6, a level control signal is supplied to said input amplifiers 2, and the level of the input signal supplied to the input terminal 1 is adjusted according to the value adjusted by the input level adjusting volumes 71 in said key input section 7. The level information about the input level obtained by the input level adjusting volumes 71 in said key input section 7 is supplied to said sub-code processing circuit 5 via the control section 6. The sub-code processing circuit 5 codes the level information adjusted by the input level adjusting volumes 71 of the key input section 7, and transmits it to said digital disposal circuit 4.
[0014]
The input signal to which digital conversion of the digital disposal circuit 4 was carried out by said A/D converter 3
Information and the level information from said sub-code processing circuit 5 are multiplexed, and it sends out to the record circuit 8. In response to said multiplexed signal, power amplification of the record circuit 8 is carried out, this is supplied to the rotary head 9, and the rotary head 9 records said multiplexed signal to the magnetic tape 10 which is the recording medium which ****ed to this rotary head 9.
[0015]
On the other hand, the multiplexed signal recorded on said magnetic tape 10 is read by the rotary head 9, and is amplified by the regenerative circuit 11 at a predetermined level. And the digital disposal circuit 4 is supplied and it separates into signaling information and level information. The former signaling information is supplied to D/A converter 12, is changed into an analog voice signal and supplied to the output amplifier 13 which constitutes an output level equalization circuit. The sub-code processing circuit 5 is supplied, it gets over to the information corresponding to the level at the time of record, and the level information in the latter sub-

code signal is brought to the control section 6.

[0016]
Said control section 6 supplies the level control signal which added the information corresponding to the level at the time of the record from said sub-code processing circuit 5 to the level control information from the output level adjusting volumes 72 in said key input section 7 to the output amplifier 13. For this reason, by said level control signal, the level control of the analog voice signal changed by D/A converter 13 is carried out, and it is brought to the output terminal 14.

[0017]
Drawing 2 shows the data format within the sub-code block in R-DAT. That is, the sub-code by which R-DAT is mainly used for the sub-data area of magnetic tape as position information is recorded. 8 blocks of this sub-code is recorded at a time on the both outsides of audio PCM, and each block consists of 288 bits and comprises 8 bits SYNC, a 16 bits header unit, 8 bits parity, and 256-bit subcode data. As shown in drawing 2, a pack comprises 64 bitwises, and said subcode data have the 4 bits item part 20, the 52 bits data division 21, and the 8-bit parity 22.

[0018]
In this design, the 52-bit packed-data part 21 shown in drawing 2 is used, and the level information about the input level adjusted with said input level control circuit 2, i.e., input amplifiers, is recorded as a digital signal at the time of record. In this case, when the input level adjusting volumes 71 in the key input section 7 are manually operated after a recording start on the basis of the level-setting value at the time of a recording start, a difference value is recorded by making that volume variation into "+" or the "-" value.

[0019]
In the time of reproduction, the difference value data corresponding to the volume variation after said recording start is reproduced by the sub-code processing circuit 5, and this is supplied to the control section 6. Said control section 6 supplies the level control signal which added the difference value information from said sub-code processing circuit 5 to the level control information from the output level adjusting volumes 72 in said key input section 7 to the output amplifier 13.

[0020]
For example, if the input level adjusting volumes 71 were operated after the recording start at −10 dB and a recording level of −5 dB was changed, for example, at this time, a recording level of +5 dB will be carried out, and will be recorded to the magnetic tape 10. And supposing an output level is adjusted by the output level adjusting volumes 72 at the time of reproduction, for example, it reproduces at −10 dB, When the playback position of a tape arrives at the portion (portion to which it was made to increase only 5 dB) which changed the recording level to −5dB, a control signal is supplied to the output amplifier 13 from the control section 6 in order to reduce a regeneration level only by 5 dB. Therefore, the reproduction output level brought to the output terminal 14 despite a join office becomes fixed with as [of −10dB].

[0021]
Although the above explained this design based on the case where it applies to R-DAT, this design is also employable as for example, an analog audio tape recorder. By namely, the thing which the information according to the amount of manual operation of the input level adjusting volumes after a recording start is made to superimpose on a record signal as a low frequency signal below an audible zone, and you record, and is made to change an output level based on this low frequency signal at the time of reproduction. The same operation effect can be obtained with having been shown in said example.

[0022]

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a block diagram showing the composition of one example at the time of applying the record reproduction level control device of this design to R-DAT.
[Drawing 2]It is a figure showing the format of the sub-code signal in the example shown in drawing 1.
[Description of Notations]
1 Input terminal
2 Input amplifiers (input level control circuit)
3 A/D converter
4 Digital disposal circuit
5 Sub-code processing circuit
6 Control section
7 Key input section
8 Record circuit
9 Rotary head
10 Magnetic tape (recording medium)
11 Regenerative circuit
12 D/A converter
13 Output amplifier (output level equalization circuit)
14 Output terminal

[Translation done.]
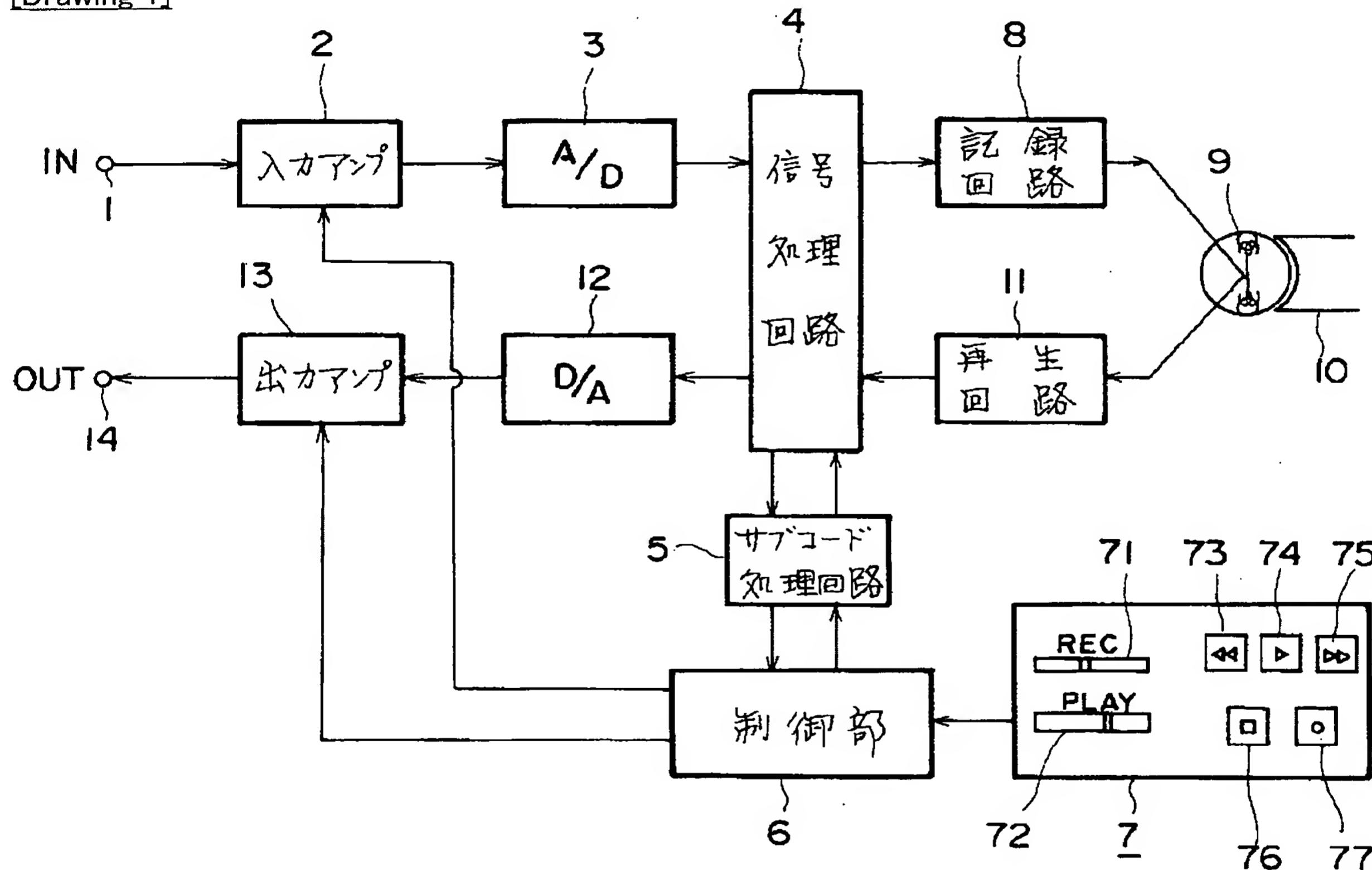
DRAWINGS

[Drawing 1]

[Drawing 2]
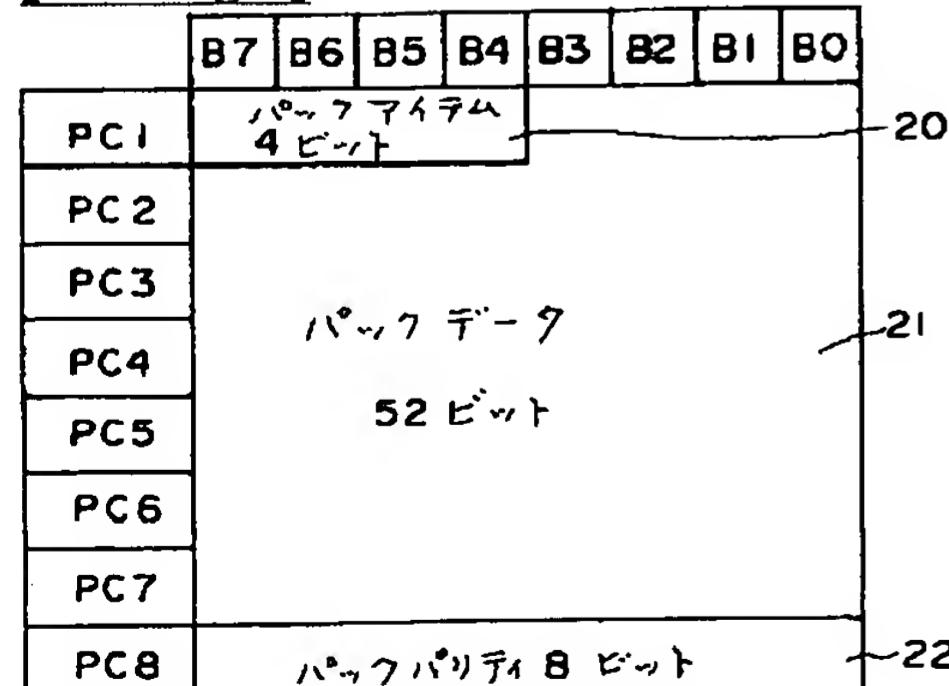
[Translation done.]

(51)Int.Cl.⁵	識別記号	庁内整理番号	FI	技術表示箇所
G11B　20/04	101　Z	7426−5D		

審査請求　未請求　請求項の数1（全　3　頁）

(71)出願人　　000001443
　　　　カシオ計算機株式会社
　　　　東京都新宿区西新宿2丁目6番1号

(72)考案者　　吉元　逸郎
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　　　　カシオ計算機株式会社羽村技術センター
　　　内

(54)【考案の名称】　記録再生レベル制御装置

(57)【要約】

【目的】　録音開始後において、録音レベルを調整し直した場合においても、再生時における再生レベルが変化することのない記録再生レベル制御装置を提供する。

【構成】　入力端子1に供給される音声信号は、キー入力部7における入力レベル調整ボリューム71によって生成されるレベル制御信号によってレベル制御され、信号処理回路4に供給される。レベル制御信号はレベル情報として処理され、記録回路8によって音声入力信号情報と共に、回転ヘッド9によって磁気テープ10に記録される。一方、磁気テープ10から読み出された信号からサブコード信号が分離される。音声信号はD／A変換器12を介して出力アンプ13に供給される。制御部6は記録時のレベルに応じた制御信号を出力アンプ13に供給する。
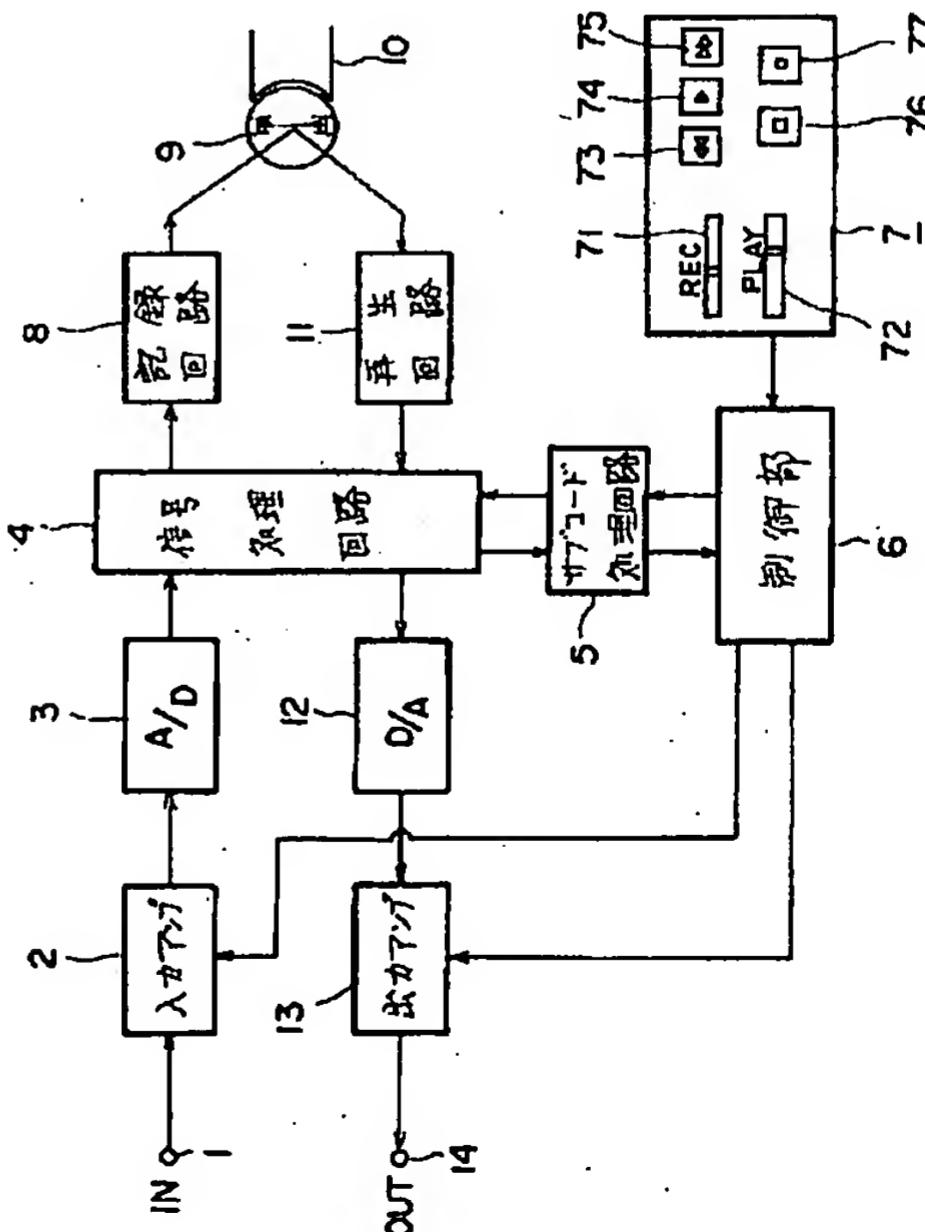
1

【実用新案登録請求の範囲】

【請求項1】　入力信号のレベルを調整する入力レベル調整回路と、

前記入力レベル調整回路によって調整された信号と前記入力レベル調整回路によって調整した入力レベルに関するレベル情報とを同一の記録媒体に対して記録する記録回路と、

前記記録媒体に記録された信号とレベル情報とを読み出して所定レベルに増幅する再生回路と、

前記再生回路によってもたらされる信号を前記再生回路によってもたらされるレベル情報によってレベル調整する出力レベル調整回路とを具備して成る記録再生レベル制御装置。

【図面の簡単な説明】

【図1】本考案の記録再生レベル制御装置をR－DATに適用した場合の一実施例の構成を示すブロック図である。

2

＊【図2】図1に示した実施例におけるサブコード信号のフォーマットを示した図である。

【符号の説明】

1　　入力端子

2　　入力アンプ（入力レベル調整回路）

3　　A／D変換器

4　　信号処理回路

5　　サブコード処理回路

6　　制御部

7　　キー入力部

8　　記録回路

9　　回転ヘッド

10　　磁気テープ（記録媒体）

11　　再生回路

12　　D／A変換器

13　　出力アンプ（出力レベル調整回路）

14　　出力端子

【図1】

【図2】

	B7	B6	B5	B4	B3	B2	B1	B0
PC1	パックアイテム 4 ビット							
PC2								
PC3								
PC4	パックデータ 52 ビット							
PC5								
PC6								
PC7								
PC8	パックパリティ 8 ビット							

20

21
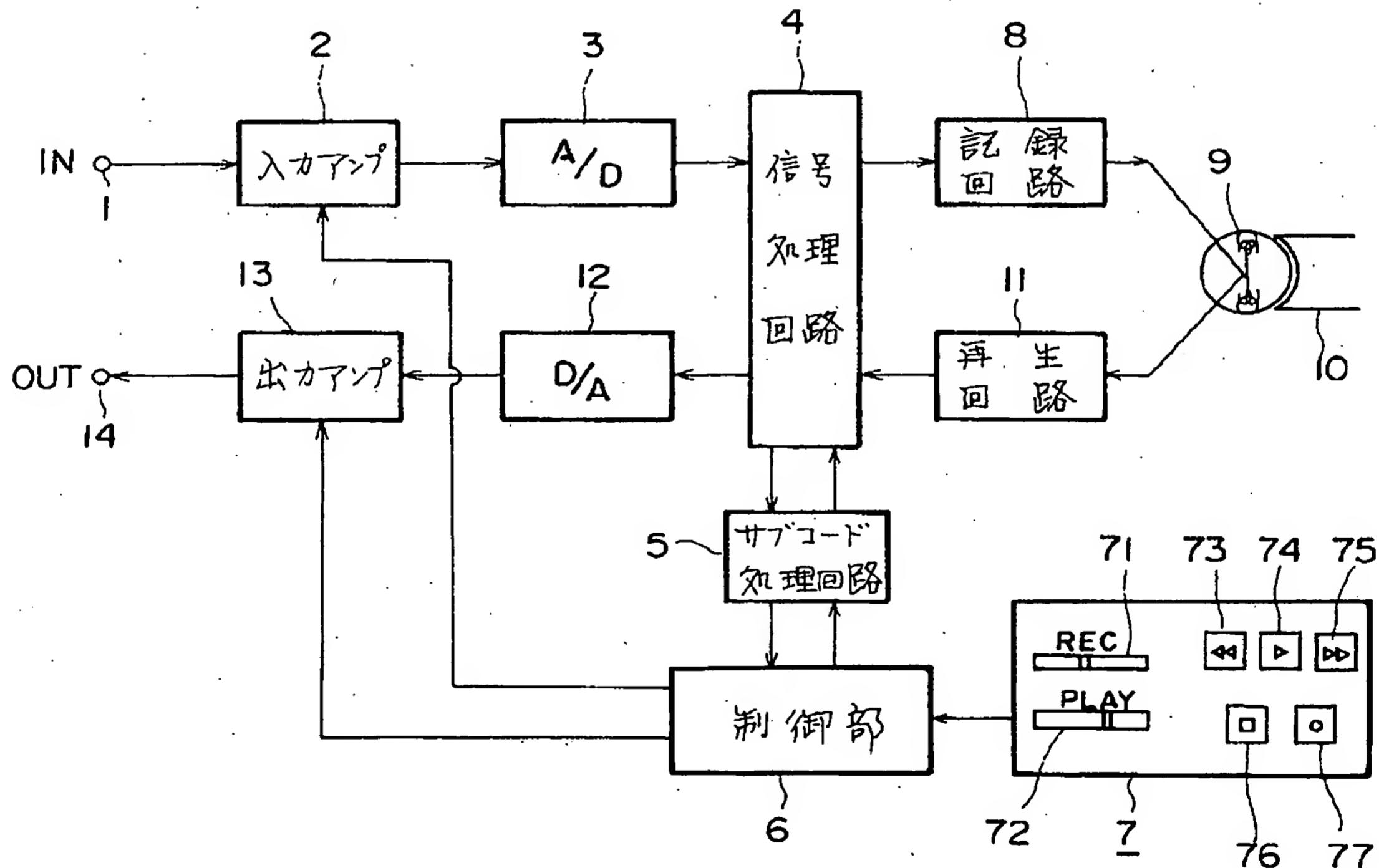
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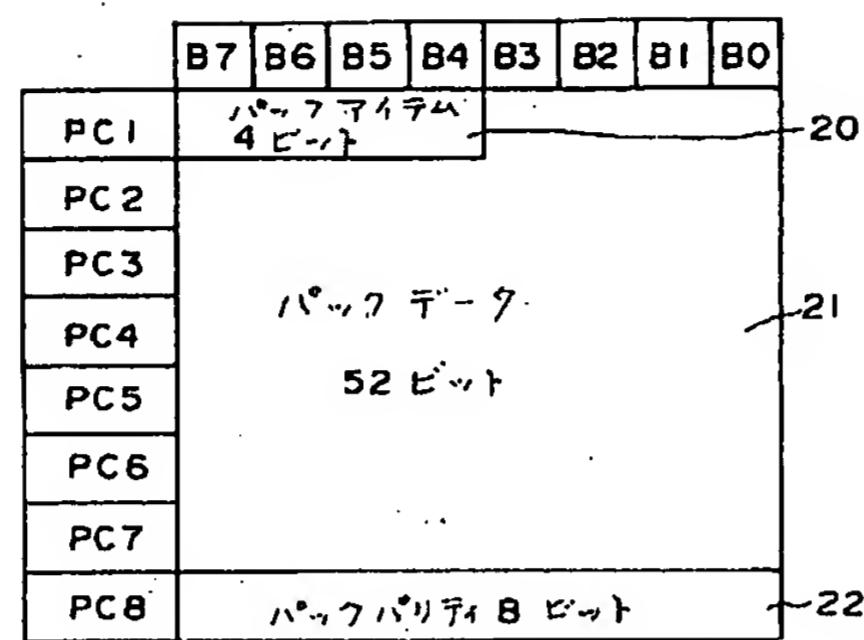
【考案の詳細な説明】

【0001】

【産業上の利用分野】

本考案は、例えばR－DAT（回転ヘッド型デジタル・オーディオ・テープレコーダ）等に用いて好適な記録再生レベル制御装置に関するものである。

【0002】

【従来の技術】

R－DAT或いはアナログオーディオテープレコーダ等を含む音声信号等の記録再生装置においては、一般に入力レベル調整回路を具備している。そして音声信号等の記録時（録音時）には予め録音するソースの入力レベルを調べて、前記入力レベル調整回路によって入力信号が歪まない限度で、なるべく録音レベルを上げて録音するようにしている。

【0003】

しかしながら録音時において、前記入力レベル調整回路によって入力レベルを合わせる際、入力レベルが最も高い部分を探すのは容易ではない。現実には録音開始後しばらくして再度録音レベルを調整し直し、記録媒体である磁気テープを巻き戻して、再度録音をし直すことも度々経験するところである。

【0004】

【考案が解決しようとする課題】

ところで、録音しようとするソースが再度得られる場合には、前記したような操作をし直す事も可能であるが、例えば録音しようとするソースが放送音楽番組等のような場合には、再度頭から録音し直すことは最早不可能である。従って最大録音レベルをオーバし、歪みの多い状態で録音したり、または過少に録音レベルを絞り、S／Nが低下した状態で録音せざるを得ないという状態が発生する。

【0005】

また、前記したような状況を避けるために録音開始後、録音中に再度録音レベルを調整し直した場合には、再生時において録音レベルを調整し直した部分より再生レベルが変化するという問題点が生ずる。

【0006】

本考案は前記したような点に鑑みて成されたものであり、録音開始後において、録音レベルを調整し直した場合においても、再生時における再生レベルが変化することのない記録再生レベル制御装置を提供することを課題としている。

【0007】

【課題を解決するための手段】

前記課題を達成するために成された本考案の記録再生レベル制御装置は、例えば入力音声信号のレベルを調整する入力アンプ2と、入力アンプ2によって調整された音声信号と、入力アンプ2によって調整した入力レベルに関するレベル情報とを同一の磁気テープ10に対して記録する記録回路8と、磁気テープ10に記録された音声信号とレベル情報とを読み出して所定レベルに増幅する再生回路11と、再生回路11によってもたらされる音声信号を再生回路11によってもたらされるレベル情報によってレベル調整する出力アンプ13とを具備した点に特徴を有する。

【0008】

【作用】

前記構成の記録再生レベル制御装置においては、入力アンプ2によって調整された音声信号と、入力アンプ2によって調整した入力レベルに関するレベル情報とが記録回路8によって同一の磁気テープ10に対して記録される。また再生時においては、再生回路11によってもたらされる音声信号を、同じく再生回路11によってもたらされるレベル情報によってレベル調整するよう成される。

【0009】

このために、録音開始後においてたとえ録音レベルを調整し直した場合においても、再生時における再生レベルは前記レベル情報によって調整され、再生レベルが途中で変化することのない再生出力を得ることが可能となる。

【0010】

【実施例】

以下、本考案を図に示す実施例に基づいて説明する。図1はR−DATを例にした本考案の記録再生レベル制御装置の一例をブロック図で示したものである。

【0011】

　図1において、1は音声信号の入力端子を示しており、この入力端子1に供給された入力信号は入力アンプ2に供給される。この入力アンプ2は、後述する制御部からのレベル制御信号を受けて入力信号をレベルを調整する入力レベル調整回路を構成しており、この入力アンプ2によってレベル調整された入力信号はA／D変換器3に供給されてデジタル信号に変換される。

【0012】

　前記A／D変換器3によってデジタル信号に変換された入力信号は、信号処理回路4に供給される。この信号処理回路4には、サブコード処理回路5が接続されており、このサブコード処理回路5には、さらにマイクロコンピュータより成る制御部6が接続されている。前記制御部6には各種の動作モードを指示するキー入力部7が接続されており、このキー入力部7には、音声信号の記録時のレベルを調整する入力レベル調整ボリューム71、再生時における再生音声信号の出力レベルを調整する出力レベル調整ボリューム72、機器の巻き戻しモードを選択するREW釦73、再生モードを選択するPLAY釦74、早送りモードを選択するFF釦75、停止を選択するSTOP釦76、および録音モードを指示するREC釦77等が配置されている。

【0013】

　そして、前記制御部6からは前記入力アンプ2に対してレベル制御信号が供給され、前記キー入力部7における入力レベル調整ボリューム71によって調整された値に応じ、入力端子1に供給された入力信号のレベルが調整される。また前記キー入力部7における入力レベル調整ボリューム71によって得られる入力レベルに関するレベル情報は、制御部6を介して前記サブコード処理回路5に供給される。サブコード処理回路5はキー入力部7の入力レベル調整ボリューム71によって調整されたレベル情報をコード化し、前記信号処理回路4に伝達する。

【0014】

　信号処理回路4は、前記A／D変換器3によってデジタル変換された入力信号情報と、前記サブコード処理回路5からのレベル情報とを多重化して記録回路8に送出する。記録回路8は前記多重化信号を受けて電力増幅し、これを回転ヘッド9に対して供給し、回転ヘッド9はこの回転ヘッド9に摺接した記録媒体であ

る磁気テープ１０に対して前記多重化信号を記録する。

【００１５】

　一方、前記磁気テープ１０に記録された多重化信号は、回転ヘッド９によって読み出され、再生回路１１によって所定レベルに増幅される。そして信号処理回路４に供給されて信号情報とレベル情報とに分離される。前者の信号情報はＤ／Ａ変換器１２に供給されてアナログ音声信号に変換され、出力レベル調整回路を構成する出力アンプ１３に供給される。後者のサブコード信号中のレベル情報は、サブコード処理回路５に供給されて記録時のレベルに対応した情報に復調されて制御部６にもたらされる。

【００１６】

　前記制御部６は、前記キー入力部７における出力レベル調整ボリューム７２からのレベル制御情報に前記サブコード処理回路５からの記録時のレベルに対応した情報を加算したレベル制御信号を、出力アンプ１３に対して供給する。このためにＤ／Ａ変換器１３によって変換されたアナログ音声信号は、前記レベル制御信号によってレベル制御され、出力端子１４にもたらされる。

【００１７】

　図２は、Ｒ−ＤＡＴにおけるサブコードブロック内のデータフォーマットを示したものである。すなわちＲ−ＤＡＴは、磁気テープのサブデータエリアに主に位置情報として利用されるサブコードが記録される。このサブコードは音声のＰＣＭの両外側に８ブロックずつ記録され、各ブロックは２８８ビットからなり、８ビットのＳＹＮＣ、１６ビットのヘッダ部、８ビットのパリティ、および２５６ビットのサブコードデータで構成されている。前記サブコードデータは図２に示すように６４ビット単位でパックが構成され、４ビットのアイテム部２０と、５２ビットのデータ部２１と、８ビットのパリティ２２をもっている。

【００１８】

　本考案においては、図２に示す５２ビットのパックデータ部２１を利用して記録時において、前記入力レベル調整回路すなわち入力アンプ２によって調整した入力レベルに関するレベル情報をデジタル信号として記録する。この場合、記録開始時のレベル設定値を基準として、記録開始後にキー入力部７における入力レ

ベル調整ボリューム71を手動にて操作した場合、そのボリューム変化量を“＋”または“−”値として差値を記録する。

【0019】

再生時においては、サブコード処理回路5により、前記記録開始後のボリューム変化量に対応する差値データが再生され、これが制御部6に供給される。前記制御部6は、前記キー入力部7における出力レベル調整ボリューム72からのレベル制御情報に、前記サブコード処理回路5からの差値情報を加算したレベル制御信号を出力アンプ13に対して供給する。

【0020】

例えば、−10dBで記録開始後に入力レベル調整ボリューム71を操作して、録音レベルを例えば−5dB変化させたとすれば、この時録音レベルは＋5dBされて磁気テープ10に対して記録されることになる。そして再生時に出力レベル調整ボリューム72によって出力レベルが調整され、例えば−10dBで再生したとすると、録音レベルを−5dBに変化させた部分（5dBだけ増加させた部分）にテープの再生位置が到来した場合には、再生レベルを5dBだけ低下させるべく、制御部6より出力アンプ13に制御信号が供給される。従って、結局のところ出力端子14にもたらされる再生出力レベルは−10dBの一定のままとなる。

【0021】

なお、以上は本考案をR−DATに適用した場合に基づいて説明したが、本考案は例えばアナログオーディオテープレコーダに採用することもできる。すなわち、録音開始後の入力レベル調整ボリュームの手動操作量に応じた情報を可聴帯域以下の低周波信号として記録信号に重畳させて記録し、再生時においてこの低周波信号に基づいて出力レベルを可変させることで、前記実施例に示したと同様な作用効果を得ることができる。

【0022】

【考案の効果】

以上のように、本考案の記録再生レベル制御装置によれば、入力レベル調整回路すなわち入力アンプによって調整された入力信号と入力アンプによって調整し

た入力レベルに関するレベル情報とが記録回路によって同一の記録媒体すなわち磁気テープに対して記録される。また再生時においては、出力レベル調整回路すなわち出力アンプにおいて、磁気テープより読み出された再生信号情報を、同じく磁気テープより読み出されたレベル情報によってレベル調整するよう成される。

【0023】

このために、録音開始後においてたとえ録音レベルを調整し直した場合においても、再生時における再生レベルは、前記レベル情報によって調整され、再生レベルが途中で変化することのない再生出力を得ることが可能となる。

従って録音時のレベル調整は比較的安易に行うことができ、録音開始後において録音レベルが不適性であると判明した際、入力レベル調整ボリュームを操作することで歪みの少ない、且つS／Nの良好な記録再生が達成できる。